

WHAT IS CLAIMED IS:

1. A substrate for a semiconductor device comprising:

a crystalline silicon substrate;

5 an insulative silicon compound layer thereon and

a crystalline insulation layer on said insulative silicon compound layer,

wherein said insulative silicon compound layer contains not more than 10at% of component element of a material constituting said crystalline insulation layer, the component element being provided in said insulative silicon compound layer by diffusion.

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2. A semiconductor device substrate according to claim 1, wherein the component element is not more than 5at%.

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3. A semiconductor device substrate according to Claim 1, wherein said crystalline insulation layer comprises at least one of YSZ,  $\text{Al}_2\text{O}_3$ ,  $\text{CeO}_2$ ,  $\text{MgO}$ ,  $\text{SrTiO}_3$  and  $\text{ZrO}_2$ , and said insulative silicon compound layer comprises at least one of silicon oxide, silicon nitride and silicon oxide nitride.

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4. A SOI substrate comprising said substrate for

the semiconductor device as defined in Claim 1,  
further comprising a crystalline silicon on said  
crystalline insulation layer.

5           5. A manufacturing method for a semiconductor  
device substrate, comprising:

          ejecting in non-active gas a metal oxide  
constituting a crystalline insulation layer;

          forming a crystal layer of a crystalline  
10   insulative material on a silicon substrate heated up  
to not lower than 400°C;

          forming an insulative silicon compound layer  
on said silicon substrate by oxygen diffusion from an  
oxide during said crystal layer formation step, oxygen  
15   diffusion during a temperature holding time after said  
crystal layer formation step and/or oxygen diffusion  
during cooling operation.

          6. A method according to Claim 5, wherein said  
20   silicon substrate and said target are disposed opposed  
to each other in a sputtering apparatus, and discharge  
of the non-active gas supplied into the sputtering  
apparatus is produced to grow the crystal layer of  
said crystalline insulative material.

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          7. A method according to Claim 5, wherein said  
target comprises  $ZrO_2$  and  $Y_2O_3$  which are mixed or

which are solved; said non-active gas is argon; said  
crystalline insulation layer is YSZ; said insulative  
silicon compound is silicon oxide; and a component  
constituting the crystalline insulation layer which  
5 are contained in insulative silicon compound by  
diffusion is Zr and/or Y.

8. A method for manufacturing SOI substrate  
comprising a method as defined in Claim 5, wherein  
10 crystalline silicon film is formed on the crystalline  
insulation layer which is formed on the silicon  
substrate.

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